



Harmonizing Textual and Graphical Visualizations of Domain Specific Models

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- **Motivation & Target**
- Harmonized Graphical and Textual Editing
- Demo

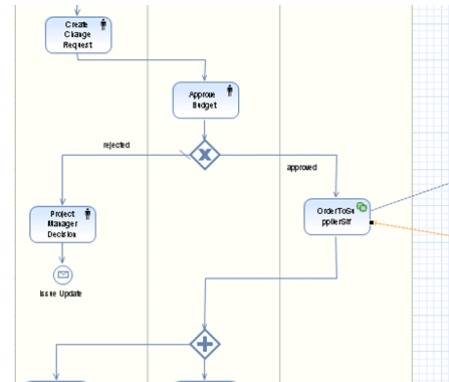
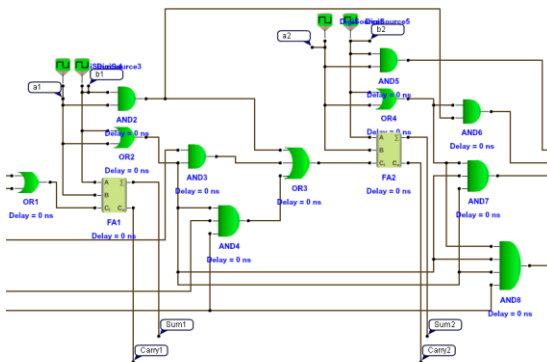


- Domain-specific languages are **widely spread**
 - **Textual:** HTML, CSS, BPEL, ...

```
if(preg_match('/^\<?php include "data\.php"; getHe
$params = explode(", ", $m[1]);
$ps = preg_replace(array('/^\["\']/s','/["\']/s
?>
<p>Seitentitel: <input type="text" style="width
<input type="hidden" name="meta" value="<?php e
<input type="hidden" name="start" value="<?php
<input type="hidden" name="filetype" value="pag
<?php
)else(
$lb = true;
)
)
/*
This style sheet contains examples of common CSS authoring
*/
.e1 {
font-size: 2 px; /* space between number and unit */
}
.e2 {
font-size: 12; /* missing length unit */
}
.e3 {
font-family: arial; /* missing generic font - should add sa
}
.e4 f
```

```
-->
<!--
=====
-->
<sequence name="main">
  <receive name="receiveInput" partnerLink="client"
    createInstance="yes" operation="process" portI
  </receive>
  <bpel:assign validate="no" name="AssignInputToJob1
    <bpel:copy>
      <bpel:from>
        <bpel:literal xml:space="preserve"><tr
s:executeJob>
a1:literal>
```

- **Graphical:** Electric Circuits, BPMN, ...



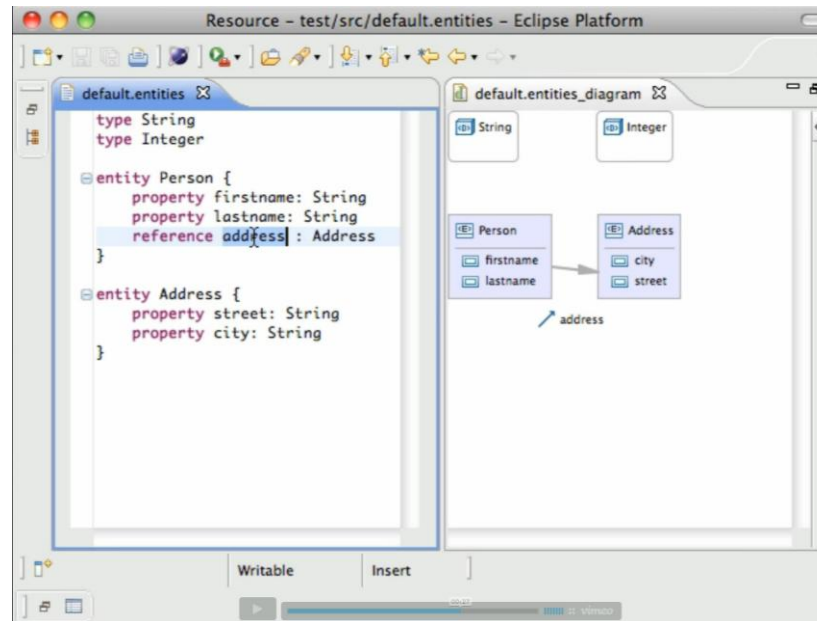


- Domain-specific Language **Workbenches** are highly focused towards
 - **Text-based languages:** EMFText, Spoofax, JetBrains MPS, Xtext

- **Graphical Languages:** Generic Modeling Environment, Graphical Modeling Framework, Poseidon for DSLs, MetaEdit+



- Sometimes one wants to edit in a **mixed textual and graphical editor**



from xtext.org

- If **graphical and textual** domain-specific workbench **base on the same infrastructure**, they can be **wired together** e.g. XText + GMF
- **Non-trivial glue code** needs to be created to wire these two technologies up



- A **domain-specific language workbench** which allows to **create graphical and textual DSLs**
 - Using **one tool and one language** definition mechanism
 - Allow **simultaneous editing** in textual and graphical editor without synchronization problems and visual glitches
 - A workbench that makes **changes** to abstract and concrete syntax **immediately available**
 - Domain-specific languages featuring **more than one type/instance level**



- Motivation & Target
- **Harmonized Graphical and Textual Editing**
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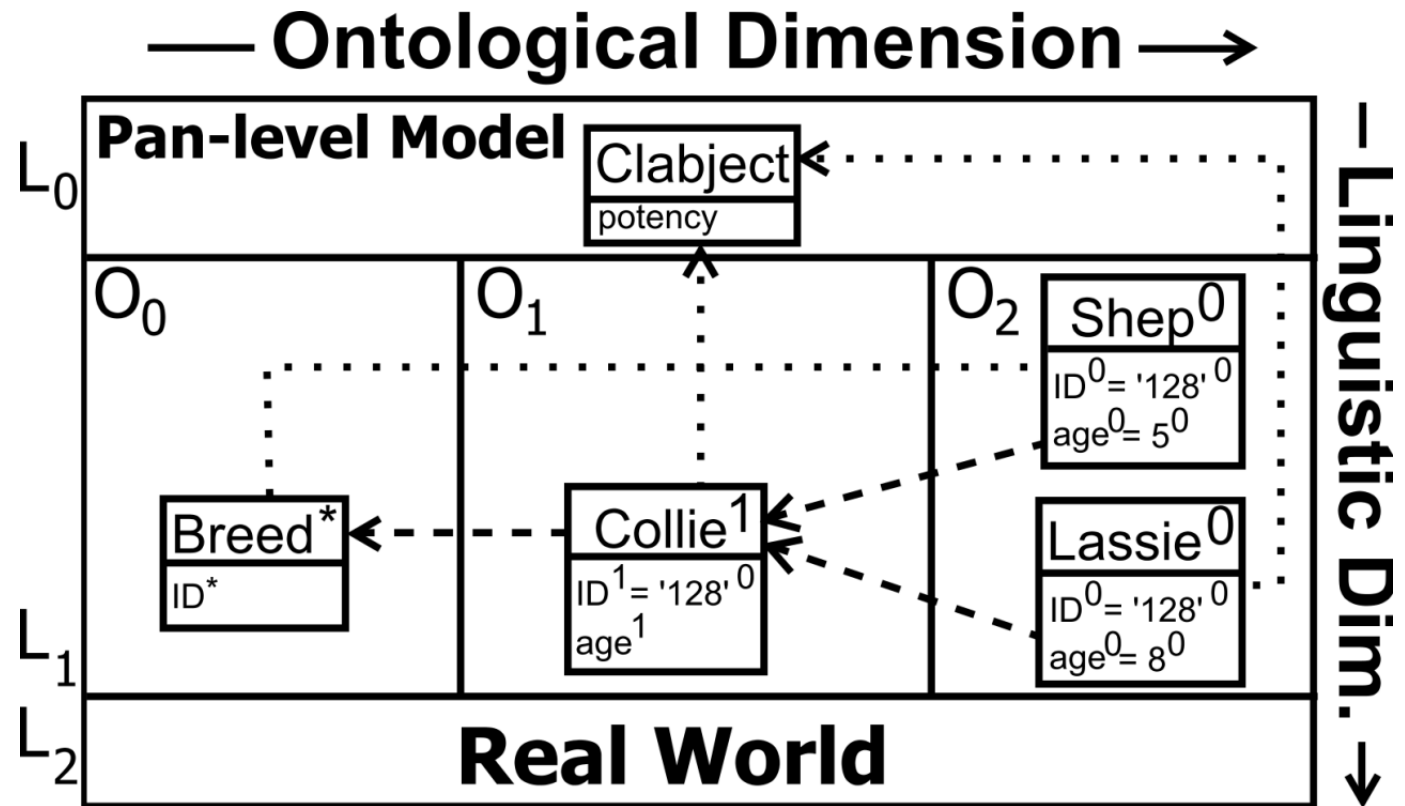


- **Multi-level Modeling**
- **Separation of Abstract and Concrete syntax definition**
- **Projectional textual and graphical editors**

from <http://www.kultiversum.de/>



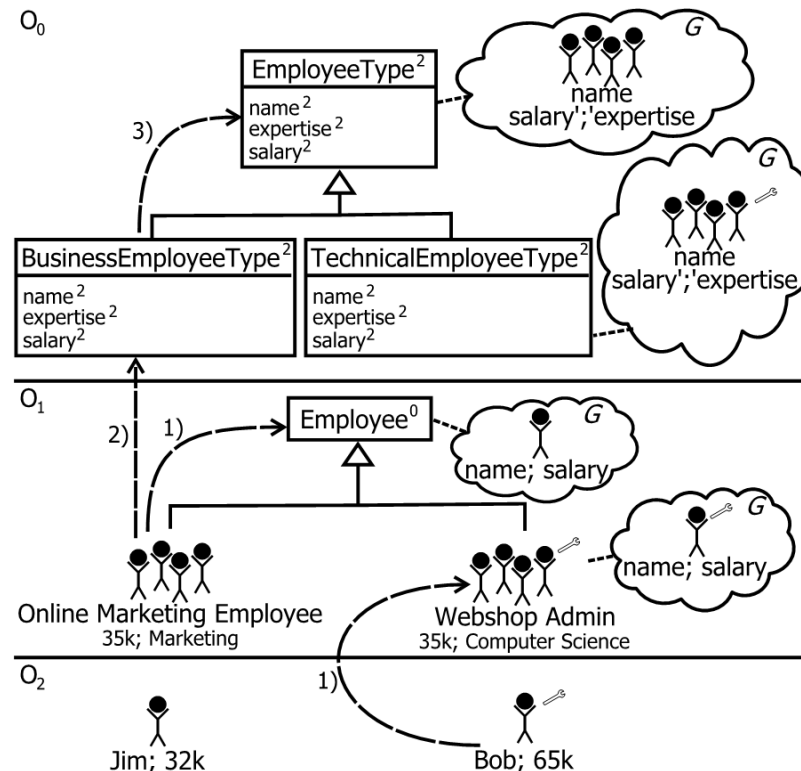
- Arbitrary number of classification levels
- Ontological and linguistic classification
 - Traits and Attributes
- Clabject
- Potency



Separation of Abstract and Concrete Syntax



- Model elements are **annotated with visualizers**
- **One element** can have **multiple visualizers** attached
- Visualizers are **available for textual and graphical** languages
- **visualizer search algorithm** finds visualizer to use for rendering





- Motivation & Target
- Harmonized Graphical and Textual Editing
- **Demo**

MelanEE - Screencast



Melanie - Company/structure.lml - Eclipse Platform

File Edit Diagram Navigate Search Project Diagram Services Samples Run Window Help

Segue UI 9 B I A 100%

Quick Access Melanie

Proj... Company figures structure.lml

structure.lml

```
classDiagram
    class Company {
        name:String
    }
    class Department {
        name:String
    }
    class EmployeeType {
        name:String
        expertise:expertise
        salary:Integer
    }
    Company "1" -- "1..*" Department
    Department "1..*" -- "1..*" EmployeeType
```

O1

Pineapple Company

Marketing Department

Computer Department

Marketing Emp
Computer Skills, Se
45

Computer Ex
Web Developr

Palette

- Ontology Defi...
- Ontology
- Model
- Enumeration
- Domain Defi...
- Entity
- Connection / Role
- Attribute
- Method
- Correlation D...
- Classification
- Generalization
- Complement
- Equal
- Inversion

*Company Structure::O1

```
Pineapple Company {
  Computer Department {
    Computer Expert(Web Development, 43k)
  }
  Marketing Department {
    Marketing Employee(Computer Skills, Second skill, 45k)
  }
}
```

Outli...

Entity

Linguistic	Name	Value
Ontological	durability	0
Visualization	name	default
Appearance	expressed	default
	relevant	default
	fix	default

Visualization Editor

- LML Visualizer 0
 - Textual DSL Visualizer
 - Literal
 - Value name
 - Literal {%n
 - Value employeeType
 - Literal %n }%n
 - Graphical DSL Visualizer
 - Rectangle White
 - Table Layout 1



- The harmonization of graphical and domain-specific languages can be **achieved by wiring up existing technologies**
 - **Annotation** of meta-models with **concrete syntax visualization** information (EMFText)
 - **Rendering search algorithm** across level boundaries (Meta-model Syntactic Sheets [2-level only])
 - **Projectional Editors** for Text (JetBrains MPS)
 - **Meta-models to define** graphical (GMF, MetaEdit+) and textual **concrete syntaxes** (EBNF, Antlr, EMFText, Spoofox)
- We are **currently ...**
 - **refining** the graphical and textual **editors**
 - **experimenting with the import of EBNFs** and try to **extend** our editor **towards the expressiveness of EBNF**

Thank You!

